

1. A method for fluorescence labeling of lipid membranes, the method comprising contacting the lipid membranes with an effective amount of lipophilic, functionalized nanocrystals, wherein the functionalized nanocrystals become incorporated into the lipid membranes in labeling the lipid membranes.

2. The method according to claim 1, wherein the lipid membranes comprise individual cells.

3. The method according to claim 1, wherein the lipid membranes comprise a tissue comprised of multiple populations of cells.

4. The method according to claim 1, wherein the lipid membranes comprise liposomes.

5. A method for fluorescence detection of lipid membranes, the method comprising the steps of:
(a) contacting the lipid membranes with an effective amount of lipophilic, functionalized nanocrystals, wherein the functionalized nanocrystals become incorporated into the lipid membranes in labeling the lipid membranes;
(b) exposing the labeled lipid membranes to an excitation light source suitable for exciting the functionalized nanocrystals to emit a fluorescence emission; and
(c) detecting the fluorescence emission emitted by the excited functionalized nanocrystals.

6. The method according to claim 5 further comprising mixing the functionalized nanocrystals with a physiologically acceptable carrier prior to contacting the functionalized nanocrystals with the lipid membranes.

7. The method according to claim 5, wherein the excitation light source comprises a spectrum in the range of from about 300 nm to about 400 nm.

8. The method according to claim 5, wherein the fluorescence emission emitted by the excited functionalized nanocrystals is in a spectral range of from about 400 nm to about 750 nm.

9. The method according to claim 5, wherein detecting the fluorescence emission comprises use of one or more of a photodetector, a filter, a CCD camera, a fluorescence microscope, an endoscopic imaging system, an endoscopic fluorescence imaging microscope, a fiber optic fluorescence imaging microscope, a fluorescence cube, and a computer.

10. The method according to claim 5, further comprising quantitating the amount of labeled lipid membranes detected by measuring the intensity of fluorescence emission.

11. The method according to claim 5, wherein the lipid membranes comprise individual cells.

12. The method according to claim 5, wherein the lipid membranes comprise a tissue comprised of multiple populations of cells.

13. The method according to claim 5, wherein the lipid membranes comprise liposomes.

14. The method according to claim 12, further comprising distinguishing diseased tissue from normal tissue by a parameter of labeled cell membranes selected from the group

consisting of cell membrane morphology, intensity of fluorescence emission, pattern of fluorescence labeling, and a combination thereof.

15. The method according to claim 12, further comprising distinguishing between different cell populations in a sample by a parameter of labeled cell membranes selected from the group consisting of cell membrane morphology, intensity of fluorescence emission, pattern of fluorescence labeling, and a combination thereof.

16. The method according to claim 11, further comprising distinguishing between different cell populations by a parameter of labeled cell membranes selected from the group consisting of cell membrane morphology, intensity of fluorescence emission, pattern of fluorescence labeling, and a combination thereof.

17. Lipid membranes labeled with lipophilic, functionalized nanocrystals.

18. The lipid membranes according to claim 17, wherein functionalized nanocrystals are incorporated into the structure of the membranes.

19. The lipid membranes according to claim 17, wherein the lipid membranes comprise individual cells.

20. The lipid membranes according to claim 17, wherein the lipid membranes comprise a tissue comprised of multiple populations of cells.

21. The lipid membranes according to claim 17, wherein the lipid membranes comprise liposomes.